REQ. NO. 2-9144-11

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CONTRACT REPORT NO. OSQ82-00176

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Report On Analysis of reference uranium tailings

File No. 8618E

Report No.

Reported To Department of Energy, Mines and Resources
CANMET, Mineral Sciences Laboratories
405 Rochester St. Ottawa, Ontario

P.O. #

Date February 9, 1983

Attention: Dr. H. F. Steger

We have tested the samples submitted by you on December 8 and 28, 1982 and report as follows:

SAMPLE IDENTIFICATION:

The samples were submitted in glass bottles labelled as shown below:

Sample Identification	Bottle Number
UTS-1	1527
UTS-2	1567
UTS-3	88
UTS-4	55

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METHOD OF TESTING:

The various methods used in the analysis of the uranium tailings were as follows:

Iron, Titanium, Aluminum, Calcium, Barium & Nickel - The tailings samples were digested after accurately weighing representative subsamples into teflon beakers. To each sample a combination of acids (HF, HNO3, HCl, HClO4) was added. This combination of acids achieves complete dissolution of any silicate matrices. Reagent blanks and certified reference materials were digested and analyzed concurrently, to compensate for any contamination that could have occurred during digestion. The determination of the elements requested was performed using a Jarrell Ash Model No. 975 Atomcomp Plasma Emission Spectrograph. All solutions were analyzed in both concentrated and ten times diluted form to compensate for any viscosity and spectral interferences occurring due to sample matrix.

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Uranium - The samples were digested using a combination of nitric and perchloric acids. An aliquot of this digested solution was used to extract the uranium into an organic solvent. The uranium extract was then fused with a standard flux and the uranium is detected by Atomic Fluorescence.

Thorium - The samples were weighed into polyethylene vials and irradiated in a thermal neutron flux. After the period of irradiation samples

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METHOD OF TESTING: (CON'T)

Thorium (con't) were allowed to cool for several days. The thorium was quantified by gamma spectroscopy using a Ge (Li) semi conductor detector.

Arsenic - The tailings were digested in a combination of nitric and perchloric acids, the resulting solutions were analyzed for arsenic using hydride vapor generation atomic absorption.

Acid Soluble Sulphate (S04) - The samples were digested in a weak hydrochloric acid solution. This solution was then filtered to remove insolubles, and the sulphate ion was precipitated after adding a hot solution of barium chloride. The sulphate content was then determined gravimetrically.

Total Sulphur - This was determined using a Leco Induction furnace and titration

RESULTS OF TESTING:

See following pages.

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URANIUM TAILINGS UTS-1

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RESULTS OF TESTING:

CONSTITUENT	SAMPLE SIZE (g)	TEST PORTION				
		1	2	3	4	5
Fe (total)	0.500	4.94%	4.83%	4.85%	4.85%	4.88%
Ti	0.500	5850 ug/g	5820 ug/g	5770 ug/g	5860 ug/g	5880 ug/g
Al	0.500	6.28%	6.22%	6.27%	6.25%	6.27%
Ca	0.500	5.26%	5.21%	5.25%	5.25%	5.20%
Ba	0.500	342 ug/g	343 ug/g	342 ug/g	345 ug/g	349 ug/g
U	1.000	23.0 ug/g	25.0ug/g	24.0ug/g	22.0ug/g	25.0 ug/g
Th	1.000	126. ug/g	125. ug/g	130. ug/g	131. ug/g	125. ug/g
S (total)	0.250	1.20%	1.15%	1.15%	1.17%	1.17%
SO_4^{2-}	1.000	2.65%	2.70%	2.64%	2.65%	2.64%

URANIUM TAILINGS UTS-2

RESULTS OF TESTING:

CONSTITUENT	SAMPLE SIZE (g)	TEST PORTION				
		1	2	3	4	5
Fe (total)	0.500	3.36%	3.31%	3.30%	3.34%	3.36%
Ti	0.500	1520. Ug/g	1570. ug/g	1520. ug/g	1470. ug/g	1520. ug/g
Al	0.500	2.80%	2.79%	2.79%	2.76%	2.80%
Ca	0.500	0.43%	0.43%	0.42%	0.43%	0.42%
Ba	0.500	510. ug/g	536. ug/g	537. ug/g	540. ug/g	533. ug/g
U	1.000	39.0 ug/g	42.0ug/g	39.0ug/g	42.0ug/g	41.0 ug/g
Th	1.000	159. ug/g	151. ug/g	162. ug/g	163. ug/g	157. ug/g
S (total)	0.250	3.17%	3.15%	3.20%	3.25%	3.15%
SO_4^{2-}	1.000	0.91%	0.90%	0.91%	0.92%	0.90%

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URANIUM TAILINGS UTS-3

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RESULTS OF TESTING:

CONSTITUENT	SAMPLE SIZE (g)	TEST PORTION				
		1	2	3	4	5
Fe (total)	0.500	3.34%	3.30%	3.32%	3.29%	3.30%
Ti	0.500	2030. ug/g	2080. ug/g	2090. ug/g	2090. ug/g	2100. ug/g
Al	0.500	6.03%	5.95%	5.99%	5.97%	5.99%
Ca	0.500	4.00%	3.95%	3.97%	3.96%	3.99%
Ba	0.500	214. ug/g	214. ug/g	218. ug/g	212. ug/g	215. ug/g
U	1.000	450.ug/g	450. ug/g	460. ug/g	455. ug/g	450.ug/g
Th	1.000	11.ug/g	8. ug/g	12. ug/g	11. ug/g	11.ug/g
S (total)	0.250	0.33%	0.30%	0.31%	0.27%	0.30%
SO_4^{2-}	1.000	0.082%	0.086%	0.082%	0.086%	0.082%

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URANIUM TAILINGS UTS-4

RESULTS OF TESTING:

CONSTITUENT	SAMPLE SIZE (g)	TEST PORTION				
		1	2	3	4	5
Fe (total)	0.500	2.59%	2.65%	2.56%	2.58%	2.60%
Ti	0.500	1960. ug/g	1860. ug/g	1840. ug/g	1860. ug/g	1890. ug/g
Al	0.500	6.18%	6.21%	6.12%	6.18%	6.25%
Ca	0.500	1.73%	1.77%	1.73%	1.73%	1.74%
Ba	0.500	80.3 ug/g	80.8ug/g	90.6ug/g	80.8ug/g	81.7 ug/g
U	1.000	930. ug/g	920. ug/g	1000. ug/g	955. ug/g	950. ug/g
Th	1.000	17. ug/g	16. ug/g	17. ug/g	16. ug/g	16. ug/g
S (total)	0.250	2.27%	2.30%	2.26%	2.35%	2.25%
SO_4^{2-}	1.000	5.39%	5.27%	5.28%	5.24%	5.27%
Ni	0.500	195. ug/g	194. ug/g	192. ug/g	194. ug/g	192. ug/g
As	0.500	52.0ug/g	53.0ug/g	52.0ug/g	53.0ug/g	52.0 ug/g